AN ESTIMATE OF THE MIGRATORY TIMING AND ABUNDANCE OF SOCKEYE SALMON INTO UPPER COOK INLET, ALASKA, IN 2002

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ABSTRACT

A test fishery was conducted during the 2002 Upper Cook Inlet commercial salmon fishery. The objectives of this project were to estimate the abundance and run-timing of the sockeye salmon *Oncorhynchus nerka* return as it passed a transect located along the southern boundary of the management area. Three inseason estimates of the total sockeye salmon return were calculated. The test fishery operated from 1-July to 30-July and captured 2,579 sockeye salmon representing 1,736 CPUE (catch per unit of effort) points. The mean date of the run was 13-July, and the test fishery encompassed approximately 95.1% of the total run. A variation of the method used to make post-season adjustments to the test fishery cumulative CPUE statistic was developed and compared to the original method.

KEY WORDS: Salmon, *Oncorhynchus*, Upper Cook Inlet, Alaska, test fishery, migratory behavior

INTRODUCTION

In 1979 the Alaska Department of Fish and Game (ADF&G) began an Offshore Test Fish (OTF) project near the southern boundary of the Upper Cook Inlet (UCI) salmon management area (Figure1). The objective of this project was to estimate the total run and run-timing of sockeye salmon *Oncorhynchus nerka* returning to UCI during the fishing season. These data have become extremely important to ADF&G management biologists as they set and adjust commercial fishing times and areas to most effectively harvest sockeye salmon that are surplus to spawning needs. Moreover, the Alaska Board of Fisheries has made changes to management plans that require commercial fishery managers to estimate the inseason abundance of sockeye salmon so that specific components of the various management plans can be implemented. The test fish project is one of the most useful tools these managers have to make these important inseason decisions.

Test fishing results have been reported annually since 1979 (Waltemyer 1983a, 1983b, 1986a, 1986b, Hilsinger and Waltemyer 1987, Hilsinger 1988, Tarbox and Waltemyer 1989, Tarbox 1990, 1992, 1994, 1995, 1996, 1997, 1998a, 1998b, 1999, and Shields 2000, 2001). This report presents the results of the 2002 test-fishing project.

METHODS

Test Fishing

Sockeye salmon returning to Upper Cook Inlet were sampled by fishing geographically fixed stations between Anchor Point and the Red River Delta (Figure 1). Stations were numbered consecutively from east to west, with station locations (latitude-longitude) being determined with global positioning system technology. A chartered test-fishing vessel sampled six stations (numbered 4, 5, 6, 6.5, 7 and 8) daily, traveling east to west on odd-numbered days and west to east on even-numbered days.

Sampling started on 1 July and continued through 30 July. The chartered vessel, *F/V Corrina Kay*, fished 366 m (1,200 ft) of 13 cm (5 1/8 in) multi-filament drift gillnet. The net was 45 meshes deep and was constructed of double knot Super Crystal shade number 1 with a filament size of number 53/S6F.

All salmon captured in the drift gillnet were enumerated and identified to species and sex; sockeye salmon only ($n \leq 30$ at each station) were measured for fork length (mid-eye to fork-of-tail) to the nearest mm and also had a scale removed (for age determination) from the left side of the fish approximately two scale rows above the lateral line on a diagonal that extended from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (Koo 1955). Scales were mounted on gum cards and impressions made in cellulose acetate as described by Clutter and Whitesel (1956). The age of each fish was determined after viewing its scale under 40X magnification using a microfiche viewer. Ages were reported in European notation (Koo 1962) and followed criteria established by Mosher (1969) and Tobias et al. (1994).

The number of fish caught at each station was expressed as a catch per unit of effort (CPUE) statistic, which standardized catch reporting to the number of fish caught in 100 fathoms of gear in one hour of fishing time.

$$CPUE_S = \frac{100\,fm \;\; x \;\; 60\,\text{min} \;\; x \;\; number\ of\ fish}{fm\ of\ gear \;\; x \;\; MFT} \qquad (1)$$

where: $CPUE_s$ = CPUE for station s, and
MFT = mean fishing time.

Mean fishing time (MFT) was calculated as:

$$MFT = (C - B) + \frac{(\text{B} - \text{A}) + (\text{D} - \text{C})}{2} \qquad (2)$$

where: A = time net deployment started,
B = time net fully deployed,
C = time net retrieval started, and
D = time net fully retrieved.

Once deployed at a station, the drift gillnet was fished 30 minutes before retrieval started. However, prior to the net being fully deployed, it was capable of capturing fish, which is also true during the period of time the net was being retrieved. MFT was therefore adjusted by summing the total time it took to set and retrieve the net and then dividing this time in half and adding it to the time when the entire net was deployed and fished.

Daily CPUE data were summed for all six stations ($CPUE_d$) and were calculated as follows:

$$CPUE_d = \sum_{s=1}^{n} CPUE_s \qquad (3)$$

The following physical and chemical measurements were taken at the start of each set: air temperature, water temperature (at 1 m below the surface), wind velocity and direction, tide stage, water depth, and water clarity. Air and water temperatures were measured using a YSI salinity/temperature meter. Wind speed was measured in knots and direction was recorded as 0 (no wind), 1 (north), 2 (northeast), 3 (east), 4 (southeast), 5 (south), 6 (southwest), 7 (west), or 8 (northwest). Tide stage was classified as 1 (high slack), 2 (low slack), 3 (flooding), or 4 (ebbing) by observing the movement of the vessel while drifting with the gill net. Water depth was measured in fathoms (fm) using a Simrad echo sounder, and water clarity was measured in meters (m) using a 17.5 cm secchi disk.

Describing the Salmon Migration

Catchability, or the fraction of the available population taken by a defined unit of fishing effort, was estimated as:

$$q_d = c_d / r_d \qquad (4)$$

where: q_d = estimated cumulative catchability on day d,
r_d = adjusted cumulative total return on day d, and
c_d = cumulative CPUE on day d.

Passage rate, the expansion factor used to convert CPUE into estimated numbers of salmon passing the test fishing transect, was calculated as:

$$PR = 1/q_d \qquad (5)$$

Since the test fishery did not encompass the entire sockeye salmon run, the total CPUE for the test fishery was estimated after the season using the following relationships:

$$CPUE_t = CPUE_f \; x \; \frac{H_t}{H_{(f+2)}} \qquad (6)$$

where: $CPUE_t$ = total estimated CPUE for the season,
$CPUE_f$ = cumulative CPUE through final day, f, of test fishing,
H_t = total commercial harvest for the season
$H_{(f+2)}$ = total commercial harvest through final day of test fishery (f+2), and
2 = number of days it took salmon to travel from test fishery to commercial harvest areas.

$$CPUE_t = CPUE_f \; x \; \frac{E_t + H_t}{E_{(+1,4,7)} + H_{(+2)}} \qquad (7)$$

where: $CPUE_t$ = total estimated CPUE for the season,
$CPUE_f$ = cumulative CPUE through final day, f, of test fishing,
E_t = total escapement for the season
H_t = total commercial harvest for the season
$E_{(+1,4,7)}$ = total Upper Cook Inlet escapement through final day of test fishery
$H_{(+2)}$ = total Upper Cook Inlet commercial harvest through final day of test fishery
1, 2, 4, 7 = number of days (lag time) it took salmon to travel from test fishery to spawning streams and to be available for commercial harvest

An important assumption in making post-season estimates of the test fishery cumulative CPUE necessitates determining how many days were required for a fish to swim from the test fishing transect to the enumeration site where it would ultimately be counted, referred to as "lag-time." As suggested by Mundy et al 1993, the following lag-times were used for the major sockeye salmon systems in UCI: Crescent River (1 d), Kasilof & Kenai Rivers (4 d), and Fish Creek and Susitna River (7 d). For the commercial harvest, a lag-time of two days was used for estimating how much of the harvest was accounted for by the test fishery.

Estimates of $CPUE_t$ and $CPUE_d$ values were used to estimate daily and cumulative proportions of $CPUE_t$, based on a non-linear model:

$$y_d = 1/(1 + e^{-(a + bd)}) \qquad (8)$$

where: y_d = cumulative proportion of CPUE or return on day d,
a and b = coefficients of model,
d = day of observation.

To calculate mean date of return, which is the day on which approximately 50% of the total run had passed the OTF transect, the following formula was used:

$$M = a/b \qquad (9)$$

where: M = mean date of return,
a and b = coefficients of model

RESULTS AND DISCUSSION

A total of 2,579 sockeye salmon, 809 pink salmon *O. gorbuscha*, 1,537 chum salmon *O. keta*, 1,184 coho salmon *O. kisutch*, and 6 chinook salmon *O. tshawytscha*, were captured during the 2002 test fishery (Table 1, Appendices A-D). Daily sockeye salmon catches ranged from 6 to 338 fish (Table 1). The 9 July and 13 July sockeye salmon catches of 338 and 305, respectively, were the second and third largest single day catches since the test fish program began in 1979. Additionally, the 27 July total catch of 230 coho salmon (CPUE = 133) was the third largest single day catch, exceeded only by last year's 25 July and 26 July catches of 350 and 315, respectively (Appendix C2). Moreover, the 2002 total CPUE for coho salmon of 798 was the largest yearly CPUE ever realized by the test fish program (Appendix C3). However, it is important to note that station 6.5 – where significant catches have taken place - has only been fished since 1992, and from 1992 through 1997, this station was fished only every other day. Caution must be taken when using test fish daily or annual catches and CPUE values to make comparative assessments of stock abundance. Due to variations in catchability within and between years, test fish catches must be calibrated with commercial harvest and escapement data to derive inseason estimates of catchability, passage rates, and stock abundance.

The cumulative total sockeye salmon CPUE for the duration of the 2002 project was 1,736 (Table 1), with CPUE values ranging from 5 on July 8 to 209 on July 9. Analysis of post-season commercial harvest data indicated that the 2002 test-fishing project spanned approximately 99.3% of the total run. Therefore, the total CPUE for the test fishery would have been 1,749 if test fishing had continued throughout the duration of the run. However, due to recent Board of Fisheries (BOF) actions, which restricted the commercial fishery in August, combined with weak sockeye salmon returns to UCI in 2000-2001, which also resulted in late-season restrictions or closures to the fishery, adjustments to the test fish CPUE using commercial harvest data may not accurately reflect the number of sockeye salmon that entered the district after the test fishery was completed. An alternative method using total return (commercial harvest plus escapement) to adjust the test fishing final CPUE was developed and is reported here for comparative purposes with the commercial harvest method (Table 5). Using the number of sockeye salmon that were commercially harvested post-project (accounting for the 2 d lag-time) and the number that escaped the commercial fishery after the test fishing project ended (various lag times to different systems), resulted in a test fishing total CPUE estimate of 1,827. This estimate reveals the test fishery encompassed 95.1% of the return.

A non-linear mathematical model (Mundy 1979) was used to examine the daily and cumulative test fish CPUE proportions of the sockeye salmon run to UCI. This analysis suggested that 8.2% of the run had passed the transect prior to the start of test fishing on 1 July and that the run was 97.3% complete at project termination (Appendix E; Figure 2). Therefore, the mathematical model indicated that test fishing spanned only 89.1% of the return.

The distribution of sockeye salmon catches along the test fish transect were similar to the distribution of CPUE values along the transect (Tables 2 and 3). The mean date of the run was 13 July, which was two days early relative to the historic average (Table 4).

Water temperatures measured along the transect were 8-10° C early in July and then warmed to a high of 12.3° C toward the end of the month (Appendix F). The seasonal mean water temperature of 10.1° C was approximately equivalent to the 1992-2001 average of 10.3° C. Air temperatures fluctuated between 10° C and 19° C during the project, averaging 12.5° C for the year, which was very close to the long-term average. Wind velocities averaged 13 knots, which was the highest average since the testfish project began; the direction was variable, but in general winds originated out of the south. Strong winds out of the southeast on 25-July precluded the test fish boat from fishing five of the six regular stations. No attempt was made to estimate what catches would have been at these stations due to the high degree of variability in actual catches the day before and the day after the 25 July weather day.

Appendix G provides a summary of the physical data that has been collected at each of the six test fish stations since 1992, the first year that station 6.5 was fished. Station four, which is on the east side of Cook Inlet, was the shallowest station, averaging 24.5 fathoms (147 feet) in depth (changes in depth are a result of different stages of tide as well as minor differences in set location from day to day), and also had the clearest water, with a 1992-2002 secchi disk average depth of 8.2 m. In

contrast, station eight, located on the west side of Cook Inlet, averaged 28.8 fathoms in depth, but had a secchi disk average of only 2.9 m. This is the result of numerous glacial watersheds draining into the west side of Cook Inlet. In general, wind direction at all stations originated out of the southeast, and have averaged 8.6 to 10.2 knots.

During the 2002 commercial salmon fishing season, three formal estimates of the total run of sockeye salmon to UCI were completed (Appendix H). These estimates used the harvest-adjusted test fish CPUE run-timing curves. The first estimate was made on 18 July, using a passage rate of 2,550 sockeye salmon per index point. The best fit of the 2002 data matched the 1994 run-timing curve, with a total CPUE estimate of 3,452 and a total return estimate of 8.6 million fish. The mid-point of the 1994 return over the test fish transect line was 19-July, or four days later than the average mid-point of 15 July. However, test fish managers often track the top five or six best fits for evaluation during the conduct of the project to see how they perform. In this case, the only fit to an early return was to the 1993 data, which estimated a total test fish CPUE of 2,199 and a total return estimate of 5.6 million sockeye salmon. The next inseason estimate was made following the commercial fishery on 22 July. Passage rate and total sockeye salmon CPUE were estimated at 2,646 and 2,083, respectively, based upon the entry pattern of the best fit, which had changed to 1993. The total return was estimated at 5.5 million fish. However, because the last two year's returns had both been two days early, the two best fits that tracked early returns, which happened to be the 2000 and 2001 CPUE curves, were considered. Using the estimate of total test fish CPUE from these fits, a total return from 4.7 to 5.1 million was projected. Of this total, approximately 2.9 to 3.2 million were estimated to be of Kenai River origin, which resulted in a management change to the escapement goal range for the Kenai River. The preseason forecast had projected that less than two million Kenai River sockeye salmon would return in 2002, indicating a target escapement goal range of 650,000 to 850,000 past the river mile-19 sonar enumeration site on the Kenai River. The new projected return of between two and four million Kenai River sockeye salmon directed managers to meet an escapement goal of 750,000 to 950,000 in the Kenai River. In addition, management plans called for liberalization to the in-river recreational fishery bag limit as well as additional daily hours to be allowed in the personal use dipnet fishery conducted at the mouth of the Kenai River, both as a result of the increased abundance of Kenai River sockeye salmon. The final estimate of the 2002 total sockeye salmon return to UCI was made following the 25 July commercial fishery. The best two fits now emulated the 2000 and 2001 returns, projecting a total test fish CPUE of either 1,747 or 1,848. The passage rate estimate was 2,517 resulting in a total return estimate of 4.4 to 4.6 million fish. The top five fits now all tracked early runs and projected a total return of 4.6 to 5.1 million sockeye salmon. The actual total sockeye salmon return to UCI in 2002 was estimated at 4.75 million, with 2.77 million being harvested in the commercial fishery. This pattern of the top five fits changing to early or on-time returns is nearly identical to what occurred in 2001 (Shields 2001).

Table 5 shows the differences in the annual test fish cumulative CPUE statistic after post-season adjustments were made using either the harvest or total return method to make the adjustment. These modifications were made for all years since the program was initiated. Although the changes are relatively minor, they do have an effect on the curve-fitting algorithms that are used to fit the

current year's cumulative test fish CPUE to run-timing curves from previous years. The three inseason estimates of the total sockeye salmon return to UCI in 2002 are also compared using the harvest-adjusted CPUE curves with the total return-adjusted CPUE curves (Table 6). Again, the differences are relatively minor, with both methods indicating the best fit of the 25 July CPUE cumulative test fish curve tracking the 2001 data; however, for the 22 July estimate the total return-adjusted method tracked the 2001 curve as the best fit while the harvest-adjusted method indicated the 1993 CPUE curve as the best fit. Because of recent changes to management plans altering how the commercial fishery is prosecuted in August, the total return-adjusted test fish CPUE curves will now be used to make formal annual estimates of the size and timing of yearly sockeye salmon returns to UCI.

The 2002 sockeye salmon return to UCI marked the third year in a row where the mid-point of the run past the Anchor Point transect line was 13-July, which is two days earlier than the average timing across the test fish transect. Since 1988 there have only been five years where the mid-point of the return occurred before 15-July (Figure 3). As can be seen in this figure, the only time the 20-July estimate error exceeds 15% is on returns that are two or more days early. In fact, for runs that are on time or late, the 20-July test fish estimate of the total return ranges from -6% to +15% of the actual return. However, for runs that enter the district two or more days earlier than average, the OTF curve-fitting estimator does not perform nearly as well, with an average error of +51.5%. It is quite likely that as additional data representing returns with more variable run timing are added to the database the OTF projections will become even more accurate. Tarbox and Waltemeyer (1989) provide further detail into to some of the assumptions the curve fitting procedures utilize to estimate the total CPUE during the season. One of the major assumptions of the curve-fitting procedures is that 24 June represents the first day of the sockeye salmon return to UCI. Variability in actual returns can therefore result in an average or early return being misclassified as late, especially during the first couple weeks of the test fish program. For this very reason, 20 July has been the approximate date that commercial fishery managers have used for their first official estimate of each year's total return.

During the 2002 test fish project, scale samples were collected from all sockeye salmon that were used for length measurements (Table 7). These data were collected in an attempt to assess whether or not Kenai River sockeye stocks, which generally dominate the sockeye return to UCI, could be identified as they entered the district using "size at age" criteria. Statistical analyses will be conducted to compare the average size of each age-class of sockeye salmon collected at escapement monitoring sites, with the average size of the same age-classes collected at the six stations along the test fish transect. The results of these analyses will be summarized in future test fish annual reports.

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Table 1. Summary of sockeye salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2002.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE		Mean Length (mm)
			Daily	Cum	Daily	Cum	
1-Jul	6	239.0	113	113	75	75	574
2-Jul	6	221.0	34	147	27	102	561
3-Jul	6	237.0	126	273	79	181	580
4-Jul	6	217.0	43	316	34	215	581
5-Jul	6	230.5	46	362	36	251	573
6-Jul	6	230.5	89	451	66	317	565
7-Jul	6	221.5	96	547	73	390	562
8-Jul	6	209.5	6	553	5	396	572
9-Jul	6	250.0	338	891	209	605	581
10-Jul	6	220.0	104	995	79	684	546
11-Jul	6	252.5	243	1,238	158	842	577
12-Jul	6	248.5	126	1,364	82	924	585
13-Jul	6	233.0	305	1,669	183	1,107	580
14-Jul	6	217.0	9	1,678	7	1,114	568
15-Jul	6	218.5	39	1,717	31	1,145	580
16-Jul	6	248.0	166	1,883	104	1,249	584
17-Jul	6	236.5	94	1,977	63	1,313	575
18-Jul	6	241.0	47	2,024	34	1,346	565
19-Jul	6	241.5	100	2,124	65	1,411	568
20-Jul	6	217.0	69	2,193	49	1,461	559
21-Jul	6	235.5	75	2,268	55	1,516	542
22-Jul	6	219.0	11	2,279	9	1,525	573
23-Jul	6	241.5	90	2,369	63	1,588	557
24-Jul	6	223.0	15	2,384	11	1,600	565
25-Jul	1	46.5	30	2,414	19	1,619	575
26-Jul	6	206.5	42	2,456	32	1,650	562
27-Jul	6	268.5	68	2,524	41	1,692	557
28-Jul	6	221.0	26	2,550	21	1,712	536
29-Jul	6	220.5	11	2,561	9	1,721	562
30-Jul	6	223.0	18	2,579	15	1,736	554

Table 2 Estimated sockeye salmon catch by date and station, Upper Cook Inlet offshore test fish project 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
7/1	18	73	8	4	2	8	113
7/2	5	18	2	3	3	3	34
7/3	20	97	5	1	2	1	126
7/4	36	6	0	0	1	0	43
7/5	14	13	4	4	2	9	46
7/6	12	41	28	5	1	2	89
7/7	4	54	2	31	5	0	96
7/8	4	2	0	0	0	0	6
7/9	2	21	50	85	179	1	338
7/10	4	24	61	15	0	0	104
7/11	8	32	31	84	83	5	243
7/12	3	2	29	44	42	6	126
7/13	2	2	70	122	109	0	305
7/14	0	3	0	6	0	0	9
7/15	2	24	8	4	1	0	39
7/16	0	17	13	31	104	1	166
7/17	5	15	19	55	0	0	94
7/18	8	6	11	17	2	3	47
7/19	0	9	55	27	6	3	100
7/20	1	6	36	24	2	0	69
7/21	0	20	30	9	13	3	75
7/22	2	5	4	0	0	0	11
7/23	0	4	32	20	32	2	90
7/24	1	1	2	8	3	0	15
7/25		30					30
7/26	0	0	1	20	1	20	42
7/27	0	6	22	10	23	7	68
7/28	0	3	4	12	7	0	26
7/29	0	4	0	0	1	6	11
7/30	0	3	6	6	0	3	18
TOTAL	151	541	533	647	624	83	2,579
%	5.9%	21.0%	20.7%	25.1%	24.2%	3.2%	100%

Table 3. Estimated sockeye salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	13.5	43.8	6.4	3.2	1.6	6.3	74.9
2-Jul	4.2	13.8	1.6	2.5	2.4	2.5	27.0
3-Jul	14.8	56.9	3.9	0.8	1.6	0.8	78.9
4-Jul	28.0	5.1	0.0	0.0	0.8	0.0	34.0
5-Jul	10.9	10.0	3.2	2.9	1.6	7.3	35.9
6-Jul	9.6	29.5	20.7	3.9	0.8	1.6	66.2
7-Jul	3.3	40.5	1.7	23.8	4.1	0.0	73.5
8-Jul	3.4	1.6	0.0	0.0	0.0	0.0	5.1
9-Jul	1.7	17.0	36.2	54.8	98.5	0.8	209.1
10-Jul	3.4	19.2	44.6	11.7	0.0	0.0	78.9
11-Jul	6.7	24.0	23.3	52.5	47.9	4.1	158.4
12-Jul	2.6	1.7	20.2	24.7	28.0	5.0	82.1
13-Jul	3.5	3.0	45.2	69.7	61.7	0.0	183.1
14-Jul	0.0	2.6	0.0	4.7	0.0	0.0	7.3
15-Jul	2.0	18.0	6.8	3.2	0.8	0.0	30.8
16-Jul	0.0	12.5	9.4	23.3	58.3	0.8	104.3
17-Jul	4.2	11.7	13.9	33.3	0.0	0.0	63.0
18-Jul	6.0	4.7	7.3	11.5	1.7	2.4	33.5
19-Jul	0.0	7.3	32.6	18.4	4.6	2.5	65.4
20-Jul	1.5	4.6	24.3	17.3	1.7	0.0	49.3
21-Jul	0.0	15.4	21.2	6.7	9.5	2.4	55.1
22-Jul	1.6	4.1	3.2	0.0	0.0	0.0	8.9
23-Jul	0.0	3.1	23.7	14.8	20.2	1.6	63.3
24-Jul	0.9	0.8	1.6	5.8	2.4	0.0	11.5
25-Jul		19.4					19.4
26-Jul	0.0	0.0	0.7	15.2	0.8	14.8	31.5
27-Jul	0.0	4.5	10.6	6.5	14.1	5.5	41.1
28-Jul	0.0	2.5	3.2	9.6	5.5	0.0	20.8
29-Jul	0.0	3.2	0.0	0.0	0.9	5.1	9.1
30-Jul	0.0	2.6	5.0	4.7	0.0	2.6	14.9
TOTAL	121.7	383.1	370.3	425.5	369.5	66.1	1736.3
%	7.0%	22.1%	21.3%	24.5%	21.3%	3.8%	100%

Table 4. Mean date of the sockeye salmon run across Anchor Point transect, Upper Cook Inlet offshore test fish project, 1979-2002.

Year	Mean Date[a]	
	Coded	Calendar
1979	16.7	10-Jul
1980	13.9	7-Jul
1981	13.9	7-Jul
1982	22.8	16-Jul
1983	22.7	16-Jul
1984	18.5	12-Jul
1985	21.9	15-Jul
1986	22.5	16-Jul
1987	26.0	19-Jul
1988	21.4	14-Jul
1989	21.8	15-Jul
1990	25.8	19-Jul
1991	24.1	17-Jul
1992	24.4	17-Jul
1993	21.7	15-Jul
1994	27.4	20-Jul
1995	22.2	15-Jul
1996	20.8	14-Jul
1997	24.7	18-Jul
1998	24.5	18-Jul
1999	24.7	18-Jul
2000	19.8	13-Jul
2001	19.5	13-Jul
2002	19.7	13-Jul
1979-2001	21.8	15-Jul

[a] Day (1) = June 24.

Table 5. A comparison of methods used to make post-season adjustments to the OTF final CPUE.

Year	Final OTF CPUE	Post-Season OTF CPUE Adjustment		Harvest Adjusted		Total Return Adjusted	
		Harvest-adjusted	Total Return-adjusted	*a*	*b*	*a*	*b*
1979	602	651	664	-3.2451	0.1876	-3.3380	0.2004
1980	740	770	777	-2.2537	0.1640	-2.2403	0.1612
1981	364	383	387	-2.5459	0.1856	-2.5243	0.1819
1982	651	775	786	-3.6839	0.1522	-3.7156	0.1633
1983	2,464	2,472	2,474	-4.2719	0.1883	-4.2732	0.1884
1984	1,331	1,334	1,341	-3.4257	0.1855	-3.4018	0.1834
1985	1,422	1,575	1,563	-3.4581	0.1523	-3.5633	0.1626
1986	1,653	1,731	1,714	-3.7671	0.1633	-3.8642	0.1719
1987	1,404	1,422	1,428	-4.3442	0.1689	-4.6385	0.1785
1988	1,131	1,145	1,169	-3.3682	0.1639	-3.5655	0.1662
1989	619	682	692	-2.7114	0.1258	-2.7031	0.1238
1990	1,358	1,404	1,426	-5.7913	0.2259	-5.7085	0.2211
1991	1,574	1,759	1,740	-4.5806	0.1885	-4.6331	0.1919
1992	2,021	2,186	2,195	-5.4366	0.2235	-5.4043	0.2217
1993	1,815	1,882	1,913	-4.0776	0.1906	-3.9018	0.1797
1994	1,012	1,145	1,199	-4.0770	0.1553	-3.9757	0.1453
1995	1,712	1,828	1,850	-4.7036	0.2131	-4.6219	0.2078
1996	1,723	1,765	1,796	-4.6328	0.2266	-4.4605	0.2144
1997	1,656	1,705	1,826	-3.8265	0.1621	-3.7000	0.1496
1998	1,158	1,355	1,313	-3.6700	0.1473	-3.7142	0.1515
1999	2,226	2,475	2,419	-5.3100	0.2175	-5.1500	0.2081
2000	1,520	1,532	1,565	-5.1094	0.2614	-4.9141	0.2480
2001	1,586	1,594	1,630	-3.9323	0.2002	-3.9823	0.2041
2002	1,736	1,749	1,825	-4.3694	0.2292	-4.0642	0.2068

Table 6. Comparison of formal estimates of the 2002 total sockeye salmon return to Upper Cook Inlet based on offshore test fish model results.

7/18/2002 - Using Harvest Adjustments

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

Year	MSS	Estimated Total CPUE		Difference	Estimated Total Run	Timing
		Current	Previous Day			
1994	0.00079	3,371	3,452	(82)	8,595,840	Late 4 days
1987	0.00084	3,331	3,432	(101)	8,495,189	Late 2 days
1983	0.00106	2,496	2,554	(58)	6,365,469	On Time
1993	0.00111	2,199	2,235	(35)	5,608,658	Early 1 day
1991	0.00114	2,980	3,081	(100)	7,600,445	Late 2 days

7/18/2002 - Using Total Return Adjustments

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

Year	MSS	Estimated Total C		Difference	Estimated Total Run	Timing
		Current	Previous Day			
1994	0.00075	3,629	3,708	(80)	9,252,994	Late 4 days
1987	0.00095	3,543	3,676	(133)	9,034,122	Late 2 days
1983	0.00106	2,495	2,553	(58)	6,362,766	On Time
1996	0.00110	2,093	2,133	(41)	5,336,769	Early 2 days
1997	0.00119	2,854	2,896	(43)	7,277,095	Late 1 day

7/22/2002 - Using Harvest Adjustments

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

Year	MSS	Estimated Total CPUE		Difference	Estimated Total Run	Timing
		Current	Previous Day			
1993	0.00177	2,083	2,112	(29)	5,511,931	Early 1 day
1998	0.00179	2,702	2,753	(51)	7,149,174	Late 3 days
2001	0.00179	1,922	1,945	(23)	5,085,461	Early 2 days
1982	0.00183	2,569	2,614	(46)	6,797,028	Late 2 days
1986	0.00185	2,368	2,406	(38)	6,264,775	Late 1 day
2000	0.00188	1,763	1,779	(15)	4,665,977	Early 2 days

7/22/2002 - Using Total Return Adjustments

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

Year	MSS	Estimated Total CPUE		Difference	Estimated Total Run	Timing
		Current	Previous Day			
2001	0.00128	1,821	1,831	(10)	4,795,813	Early 2 days
1994	0.00174	3,291	3,380	(89)	8,666,534	Late 4 days
1993	0.00175	2,140	2,169	(29)	5,635,397	Early 1 day
1997	0.00181	2,670	2,720	(50)	7,030,500	Late 1 day
1998	0.00182	2,630	2,679	(49)	6,924,611	Late 3 days
1982	0.00183	2,314	2,348	(34)	6,092,400	Late 2 days

7/25/2002 - Using Harvest Adjustments

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

Year	MSS	Estimated Total CPUE		Difference	Estimated Total Run	Timing
		Current	Previous Day			
2001	0.00131	1,828	1,821	7	4,601,242	Early 2 days
2000	0.00181	1,747	1,741	6	4,399,188	Early 2 days
1996	0.00227	1,880	1,866	14	4,732,730	Early 2 days
1993	0.00231	2,039	2,018	21	5,131,954	Early 1 day
1988	0.00231	1,978	1,967	11	4,978,790	Early 2 days

7/25/2002 - Using Total Return Adjustments

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

Year	MSS	Estimated Total CPUE		Difference	Estimated Total Run	Timing
		Current	Previous Day			
2001	0.00122	1,803	1,809	(6)	4,539,890	Early 2 days
2000	0.00190	1,779	1,788	(9)	4,478,967	Early 2 days
1988	0.00213	2,060	2,078	(18)	5,185,400	Early 2 days
1985	0.00223	2,119	2,140	(21)	5,335,317	On Time
1993	0.00230	2,071	2,093	(22)	5,213,193	Early 1 day

Table 7 Age-composition and mean length of sockeye salmon, by station, Upper Cook Inlet offshore test fish project, 2002.

Station	Sample	Age Compositiion (%)								
No.	Size	0.2	0.3	1.2	1.3	2.2	1.4	2.3	3.2	2.4
4	131		1.5	14.5	62.6	6.9	0.8	13.0		0.8
5	318		0.9	11.3	66.7	8.5	0.3	12.3		
6	352	0.3	2.3	14.2	63.4	6.0	1.1	12.5	0.3	
6.5	331		1.5	9.4	71.3	6.3	0.6	10.9		
7	209		2.9	12.4	65.6	6.2	1.0	12.0		
8	73		1.4	11.0	54.8	15.1	0.0	17.8		
Station Average =		0.3	1.8	12.1	64.1	8.2	0.6	13.1	0.3	0.8

Station	Sample	Mean Length (mm)								
No.	Size	0.2	0.3	1.2	1.3	2.2	1.4	2.3	3.2	2.4
4	131		605	495	582	518	675	584		620
5	318		572	510	586	526	605	583		
6	352	505	598	512	582	516	601	580	498	
6.5	331		570	513	585	527	643	576		
7	209		593	511	590	517	630	587		
8	73		610	524	566	515		552		
Station Average =		505	591	511	582	520	631	577	498	620

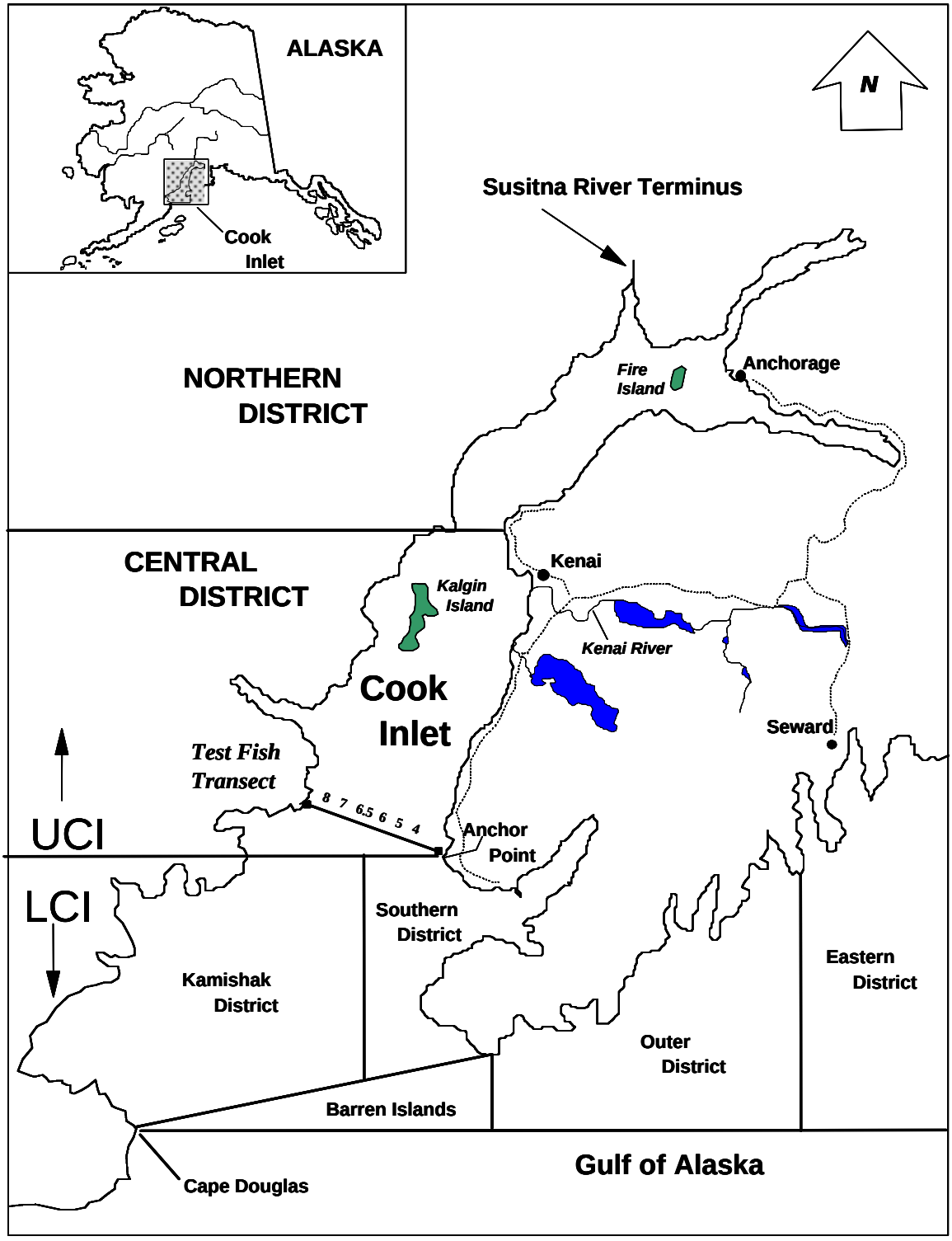

Figure 1. Location of fishing districts and offshore test fish transect in Cook Inlet, Alaska, 2002.

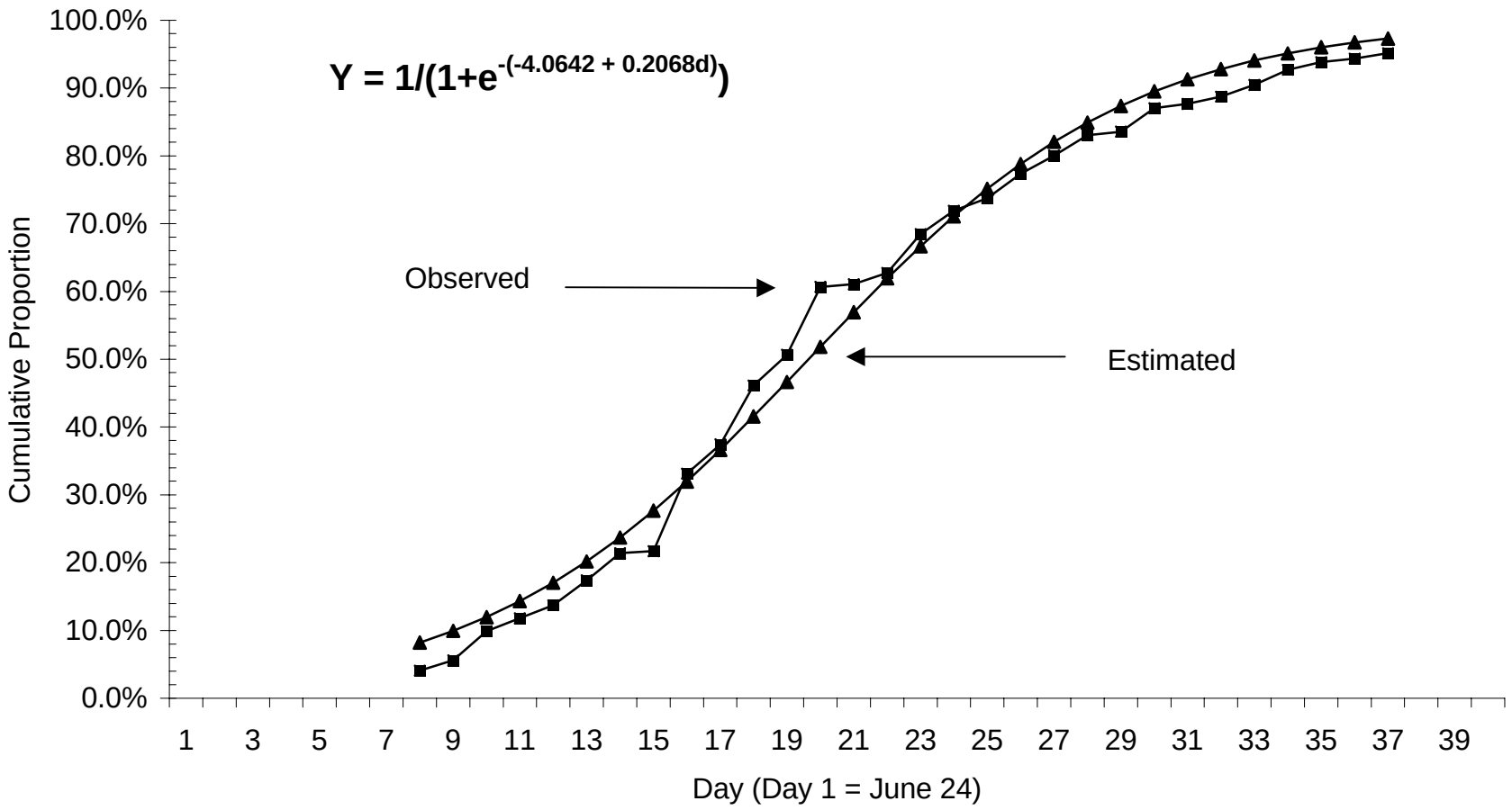

Figure 2. Cumulative proportions estimated for the sockeye salmon return to Upper Cook Inlet, Alaska 2002.

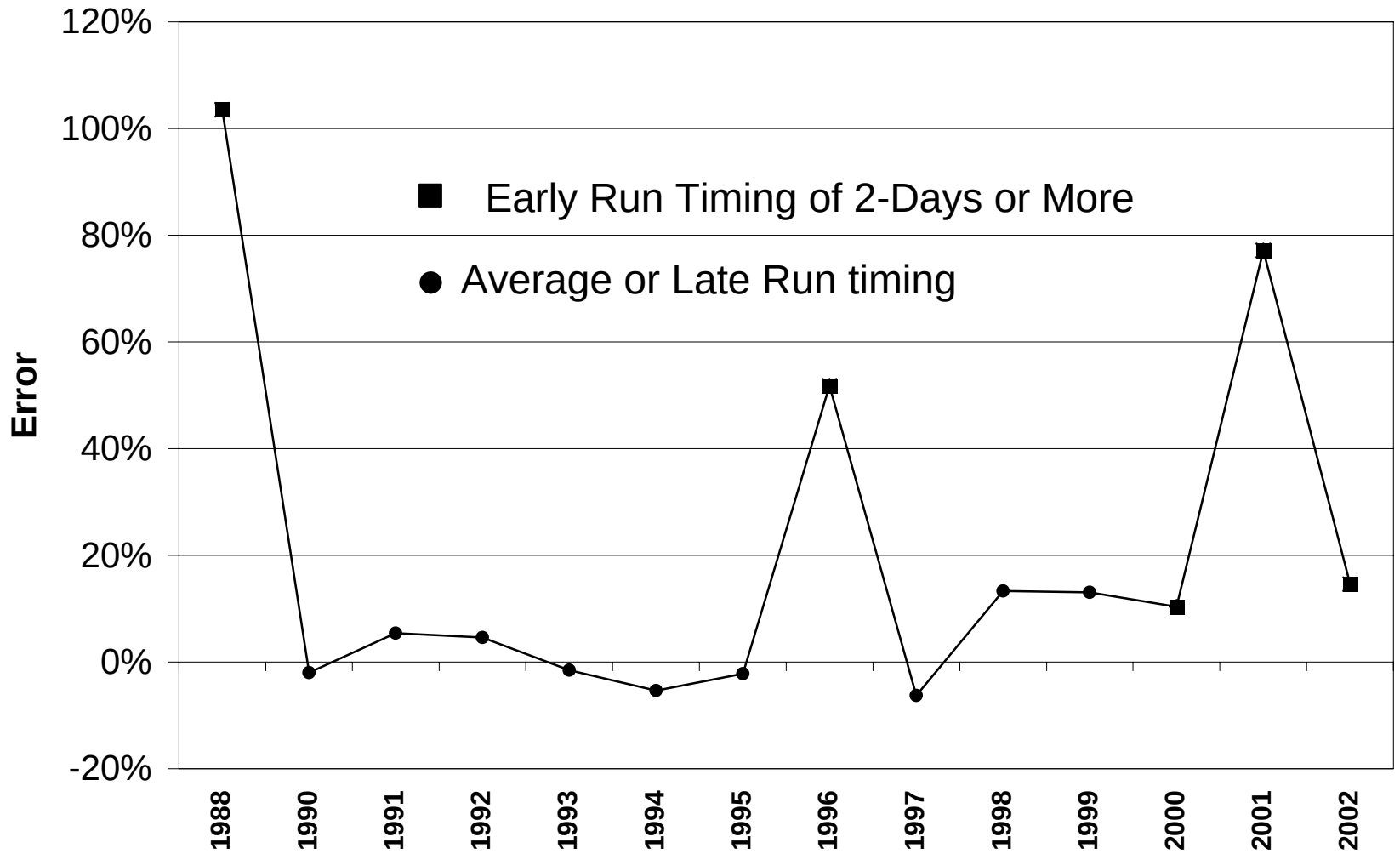

Figure 3. OTF error in forecasting the total return of sockeye salmon to Upper Cook Inlet using the July 20 best-fit estimate.

Appendix A.1. Summary of pink salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2002.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	239.0	0	0	0.0	0.0
2-Jul	6	221.0	1	1	0.8	0.8
3-Jul	6	237.0	1	2	0.8	1.6
4-Jul	6	217.0	1	3	0.8	2.4
5-Jul	6	230.5	1	4	0.8	3.2
6-Jul	6	230.5	5	9	3.7	6.9
7-Jul	6	221.5	7	16	5.4	12.3
8-Jul	6	209.5	0	16	0.0	12.3
9-Jul	6	250.0	7	23	4.8	17.1
10-Jul	6	220.0	3	26	2.2	19.3
11-Jul	6	252.5	28	54	19.5	38.9
12-Jul		248.5	35	89	22.3	61.2
13-Jul	6	233.0	62	151	37.8	99.0
14-Jul	6	217.0	8	159	6.4	105.4
15-Jul	6	218.5	15	174	12.2	117.6
16-Jul	6	248.0	62	236	41.5	159.1
17-Jul	6	236.5	44	280	29.5	188.6
18-Jul	6	241.0	33	313	23.2	211.8
19-Jul	6	241.5	58	371	40.4	252.2
20-Jul	6	217.0	59	430	42.4	294.5
21-Jul	6	235.5	65	495	48.6	343.1
22-Jul	6	219.0	13	508	10.6	353.8
23-Jul	6	241.5	47	555	33.3	387.1
24-Jul	6	223.0	50	605	38.0	425.1
25-Jul	1	46.5	24	629	15.5	440.5
26-Jul	6	206.5	21	650	15.6	456.2
27-Jul	6	268.5	75	725	46.9	503.0
28-Jul	6	221.0	34	759	26.9	529.9
29-Jul	6	220.5	27	786	22.7	552.6
30-Jul	6	223.0	23	809	18.9	571.5

Appendix A.2. Estimated pink salmon catch by date and station, Upper Cook Inlet offshore test fish project 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0	0	0	0	0	0	0
2-Jul	0	1	0	0	0	0	1
3-Jul	0	0	0	1	0	0	1
4-Jul	0	0	0	0	0	1	1
5-Jul	1	0	0	0	0	0	1
6-Jul	0	2	2	0	1	0	5
7-Jul	0	3	1	3	0	0	7
8-Jul	0	0	0	0	0	0	0
9-Jul	0	1	4	0	2	0	7
10-Jul	0	0	3	0	0	0	3
11-Jul	2	2	7	7	6	4	28
12-Jul	0	2	11	15	7	0	35
13-Jul	0	2	9	31	20	0	62
14-Jul	0	0	0	6	2	0	8
15-Jul	1	1	5	7	0	1	15
16-Jul	5	9	2	12	29	5	62
17-Jul	0	9	10	25	0	0	44
18-Jul	2	1	7	17	1	5	33
19-Jul	0	2	19	14	19	4	58.0
20-Jul	0	8	15	34	2	0	59
21-Jul	0	10	11	21	13	10	65
22-Jul	1	5	2	3	1	1	13
23-Jul	3	3	12	4	19	6	47
24-Jul	0	0	8	28	9	5	50
25-Jul		24					24
26-Jul	0	0	9	6	2	4	21
27-Jul	4	9	26	15	15	6	75
28-Jul	0	0	3	9	20	2	34
29-Jul	1	6	2	4	4	10	27.0
30-Jul	0	3	7	9	2	2.0	23.0
Total	20	103	175	271	174	66	809
%	2%	13%	22%	33%	22%	8%	100%

Appendix A.3. Estimated pink salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Jul	0.0	0.8	0.0	0.0	0.0	0.0	0.8
3-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
4-Jul	0.0	0.0	0.0	0.0	0.0	0.8	0.8
5-Jul	0.8	0.0	0.0	0.0	0.0	0.0	0.8
6-Jul	0.0	1.4	1.5	0.0	0.8	0.0	3.7
7-Jul	0.0	2.3	0.8	2.3	0.0	0.0	5.4
8-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jul	0.0	0.8	2.9	0.0	1.1	0.0	4.8
10-Jul	0.0	0.0	2.2	0.0	0.0	0.0	2.2
11-Jul	1.7	1.5	5.3	4.4	3.5	3.3	19.5
12-Jul	0.0	1.7	7.7	8.4	4.6	0.0	22.3
13-Jul	0.0	3.0	5.8	17.7	11.3	0.0	37.8
14-Jul	0.0	0.0	0.0	4.7	1.7	0.0	6.4
15-Jul	1.0	0.8	3.9	5.7	0.0	0.8	12.2
16-Jul	4.1	6.6	1.4	9.0	16.2	4.2	41.5
17-Jul	0.0	7.0	7.3	15.2	0.0	0.0	29.5
18-Jul	1.5	0.8	4.6	11.5	0.8	4.1	23.2
19-Jul	0.0	1.6	11.3	9.5	14.6	3.3	40.4
20-Jul	0.0	6.1	10.1	24.5	1.7	0.0	42.4
21-Jul	0.0	7.7	7.8	15.5	9.5	8.1	48.6
22-Jul	0.8	4.1	1.6	2.5	0.8	0.8	10.6
23-Jul	2.5	2.3	8.9	3.0	12.0	4.7	33.3
24-Jul	0.0	0.0	6.4	20.2	7.2	4.2	38.0
25-Jul		15.5					15.5
26-Jul	0.0	0.0	6.4	4.6	1.7	3.0	15.6
27-Jul	3.4	6.8	13.1	9.8	9.2	4.7	46.9
28-Jul	0.0	0.0	2.4	7.2	15.6	1.7	26.9
29-Jul	0.8	4.7	1.6	3.5	3.6	8.4	22.7
30-Jul	0.0	2.6	5.8	7.0	1.8	1.7	18.9
Total	17	78	119	187	118	54	572
%	3%	14%	21%	33%	21%	9%	100%

Appendix B.1. Summary of chum salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2002.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	239.0	61	61	37.3	37.3
2-Jul	6	221.0	7	68	5.4	42.7
3-Jul	6	237.0	24	92	16.6	59.3
4-Jul	6	217.0	1	93	0.8	60.1
5-Jul	6	230.5	63	156	47.4	107.5
6-Jul	6	230.5	20	176	14.8	122.3
7-Jul	6	221.5	14	190	10.9	133.2
8-Jul	6	209.5	0	190	0.0	133.2
9-Jul	6	250.0	76	266	48.7	182.0
10-Jul	6	220.0	8	274	6.2	188.1
11-Jul	6	252.5	138	412	88.8	276.9
12-Jul	6	248.5	166	578	101.2	378.1
13-Jul	6	233.0	60	638	38.8	416.9
14-Jul	6	217.0	8	646	6.5	423.4
15-Jul	6	218.5	21	667	16.7	440.1
16-Jul	6	248.0	70	737	44.1	484.2
17-Jul	6	236.5	80	817	50.3	534.5
18-Jul	6	241.0	66	883	44.8	579.3
19-Jul	6	241.5	72	955	45.0	624.3
20-Jul	6	217.0	55	1010	38.4	662.6
21-Jul	6	235.5	45	1055	33.3	696.0
22-Jul	6	219.0	13	1068	10.4	706.4
23-Jul	6	241.5	84	1152	56.7	763.1
24-Jul	6	223.0	31	1183	24.1	787.2
25-Jul	1	46.5	35	1218	22.6	809.8
26-Jul	6	206.5	18	1236	13.4	823.1
27-Jul	6	268.5	238	1474	138.4	961.5
28-Jul	6	221.0	14	1488	11.2	972.7
29-Jul	6	220.5	18	1506	14.9	987.6
30-Jul	6	223.0	31	1537	25.0	1012.6

Appendix B.2. Estimated chum salmon catch by date and station, Upper Cook Inlet offshore test fish project 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	3	57	0	1	0	0	61
2-Jul	1	6	0	0	0	0	7
3-Jul	8	10	4	2	0	0	24
4-Jul	0	0	0	0	1	0	1
5-Jul	15	3	7	36	0	2	63
6-Jul	0	9	8	2	1	0	20
7-Jul	0	3	0	7	4	0	14
8-Jul	0	0	0	0	0	0	0
9-Jul	4	6	11	23	32	0	76
10-Jul	0	2	2	4	0	0	8
11-Jul	3	20	14	32	69	0	138
12-Jul	1	1	30	105	27	2	166
13-Jul	0	3	22	17	17	1	60
14-Jul	0	1	1	5	1	0	8
15-Jul	1	6	5	9	0	0	21
16-Jul	0	10	9	7	43	1	70
17-Jul	2	1	8	68	1	0	80
18-Jul	1	0	26	35	2	2	66
19-Jul	0	6	56	9	1	0	72
20-Jul	0	6	34	15	0	0	55
21-Jul	1	9	5	12	18	0	45
22-Jul	0	2	11	0	0	0	13
23-Jul	1	4	14	12	52	1	84
24-Jul	0	0	21	9	1	0	31
25-Jul		35					35
26-Jul	0	0	8	8	1	1	18
27-Jul	0	6	96	49	85	2	238
28-Jul	0	4	2	4	4	0	14
29-Jul	5	6	0	2	1	4	18
30-Jul	0	1	11	17	1	1	31

Appendix B.3. Estimated chum salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	2.3	34.2	0.0	0.8	0.0	0.0	37.3
2-Jul	0.8	4.6	0.0	0.0	0.0	0.0	5.4
3-Jul	5.9	5.9	3.2	1.6	0.0	0.0	16.6
4-Jul	0.0	0.0	0.0	0.0	0.8	0.0	0.8
5-Jul	11.7	2.3	5.5	26.3	0.0	1.6	47.4
6-Jul	0.0	6.5	5.9	1.6	0.8	0.0	14.8
7-Jul	0.0	2.3	0.0	5.4	3.3	0.0	10.9
8-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jul	3.5	4.9	8.0	14.8	17.6	0.0	48.7
10-Jul	0.0	1.6	1.5	3.1	0.0	0.0	6.2
11-Jul	3.5	15.0	10.5	20.0	39.8	0.0	88.8
12-Jul	0.9	0.8	20.9	58.9	18.0	1.7	101.2
13-Jul	0.0	4.5	14.2	9.7	9.6	0.8	38.8
14-Jul	0.0	0.9	0.8	3.9	0.8	0.0	6.5
15-Jul	1.0	4.5	3.9	7.3	0.0	0.0	16.7
16-Jul	0.0	7.4	6.5	5.3	24.1	0.8	44.1
17-Jul	1.7	0.8	5.9	41.2	0.8	0.0	50.3
18-Jul	0.8	0.0	17.1	23.6	1.7	1.6	44.8
19-Jul	0.0	4.9	33.3	6.1	0.8	0.0	45.0
20-Jul	0.0	4.6	22.9	10.8	0.0	0.0	38.4
21-Jul	0.8	6.9	3.5	8.9	13.2	0.0	33.3
22-Jul	0.0	1.6	8.8	0.0	0.0	0.0	10.4
23-Jul	0.8	3.1	10.4	8.9	32.8	0.8	56.7
24-Jul	0.0	0.0	16.8	6.5	0.8	0.0	24.1
25-Jul		22.6					22.6
26-Jul	0.0	0.0	5.7	6.1	0.8	0.7	13.4
27-Jul	0.0	4.5	48.4	31.9	52.0	1.6	138.4
28-Jul	0.0	3.3	1.6	3.2	3.1	0.0	11.2
29-Jul	4.2	4.7	0.0	1.8	0.9	3.4	14.9
30-Jul	0.0	0.9	9.1	13.2	0.9	0.9	25.0
Total	37.7	153.1	264.4	320.9	222.6	13.9	1012.6
%	4%	15%	26%	32%	22%	1%	100%

Appendix C.1. Summary of coho salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2002.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	239.0	1	1	0.8	0.8
2-Jul	6	221.0	0	1	0.0	0.8
3-Jul	6	237.0	0	1	0.0	0.8
4-Jul	6	217.0	0	1	0.0	0.8
5-Jul	6	230.5	5	6	3.9	4.7
6-Jul	6	230.5	1	7	0.7	5.4
7-Jul	6	221.5	6	13	4.8	10.2
8-Jul	6	209.5	1	14	0.8	11.1
9-Jul	6	250.0	18	32	11.2	22.2
10-Jul	6	220.0	16	48	12.4	34.6
11-Jul	6	252.5	39	87	26.6	61.2
12-Jul	6	248.5	101	188	62.3	123.5
13-Jul	6	233.0	38	226	21.9	145.3
14-Jul	6	217.0	22	248	17.7	163.0
15-Jul	6	218.5	30	278	23.4	186.4
16-Jul	6	248.0	66	344	41.9	228.4
17-Jul	6	236.5	85	429	56.6	285.0
18-Jul	6	241.0	62	491	44.9	329.9
19-Jul	6	241.5	55	546	36.3	366.2
20-Jul	6	217.0	53	599	38.7	404.8
21-Jul	6	235.5	26	625	19.7	424.5
22-Jul	6	219.0	15	640	12.2	436.7
23-Jul	6	241.5	64	704	45.1	481.9
24-Jul	6	223.0	41	745	31.6	513.5
25-Jul	1	46.5	78	823	50.3	563.8
26-Jul	6	206.5	79	902	58.7	622.4
27-Jul	6	268.5	230	1132	133.1	755.5
28-Jul	6	221.0	12	1144	9.6	765.2
29-Jul	6	220.5	16	1160	13.1	778.3
30-Jul	6	223.0	24	1184	19.5	797.8

Appendix C.2. Estimated coho salmon catch by date and station, Upper Cook Inlet offshore test fish project 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0	0	1	0	0	0	1
2-Jul	0	0	0	0	0	0	0
3-Jul	0	0	0	0	0	0	0
4-Jul	0	0	0	0	0	0	0
5-Jul	1	0	0	2	0	2	5
6-Jul	0	0	1	0	0	0	1
7-Jul	0	0	1	2	3	0	6
8-Jul	0	1	0	0	0	0	1
9-Jul	1	0	0	10	7	0	18
10-Jul	0	4	4	8	0	0	16
11-Jul	0	2	4	8	14	11	39
12-Jul	0	2	13	60	22	4	101
13-Jul	0	0	5	8	25	0	38
14-Jul	1	0	1	15	2	3	22
15-Jul	0	11	12	4	2	1	30
16-Jul	0	15	8	4	38	1	66
17-Jul	0	3	30	52	0	0	85
18-Jul	18	14	6	22	0	2	62
19-Jul	0	8	36	2	7	2	55
20-Jul	0	17	17	15	4	0	53
21-Jul	2	3	5	1	9	6	26
22-Jul	0	1	8	5	0	1	15
23-Jul	4	3	20	10	25	2	64
24-Jul	0	1	21	16	3	0	41
25-Jul		78					78
26-Jul	0	0	30	13	7	29	79
27-Jul	0	21	114	24	66	5	230
28-Jul	0	3	3	4	2	0	12
29-Jul	0	5	6	1	2	2	16
30-Jul	0	2	6	13	2	1	24
Total	27	194	352	299	240	72	1,184
%	2%	16%	30%	25%	20%	6%	100%

Appendix C.3. Estimated coho salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0.0	0.0	0.8	0.0	0.0	0.0	0.8
2-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jul	0.8	0.0	0.0	1.5	0.0	1.6	3.9
6-Jul	0.0	0.0	0.7	0.0	0.0	0.0	0.7
7-Jul	0.0	0.0	0.8	1.5	2.5	0.0	4.8
8-Jul	0.0	0.8	0.0	0.0	0.0	0.0	0.8
9-Jul	0.9	0.0	0.0	6.5	3.9	0.0	11.2
10-Jul	0.0	3.2	2.9	6.2	0.0	0.0	12.4
11-Jul	0.0	1.5	3.0	5.0	8.1	9.0	26.6
12-Jul	0.0	1.7	9.1	33.6	14.6	3.3	62.3
13-Jul	0.0	0.0	3.2	4.5	14.2	0.0	21.9
14-Jul	0.8	0.0	0.8	11.8	1.7	2.5	17.7
15-Jul	0.0	8.3	9.5	3.2	1.6	0.8	23.4
16-Jul	0.0	11.1	5.7	3.0	21.3	0.8	41.9
17-Jul	0.0	3.1	22.0	31.5	0.0	0.0	56.6
18-Jul	13.5	11.0	4.0	14.8	0.0	1.6	44.9
19-Jul	0.0	6.5	21.4	1.4	5.4	1.7	36.3
20-Jul	0.0	13.1	11.5	10.8	3.3	0.0	38.7
21-Jul	1.7	2.3	3.5	0.7	6.6	4.9	19.7
22-Jul	0.0	0.8	6.4	4.2	0.0	0.8	12.2
23-Jul	3.3	2.3	14.8	7.4	15.8	1.6	45.1
24-Jul	0.0	0.8	16.8	11.6	2.4	0.0	31.6
25-Jul		50.3					50.3
26-Jul	0.0	0.0	21.4	9.9	5.9	21.5	58.7
27-Jul	0.0	15.8	57.5	15.6	40.4	3.9	133.1
28-Jul	0.0	2.5	2.4	3.2	1.6	0.0	9.6
29-Jul	0.0	3.9	4.9	0.9	1.8	1.7	13.1
30-Jul	0.0	1.8	5.0	10.1	1.8	0.9	19.5
Total	20.9	140.7	228.0	199.0	152.5	56.6	797.8
%	3%	18%	29%	25%	19%	7%	100%

Appendix D.1. Summary of chinook salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2002.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	239.0	1	1	0.6	0.6
2-Jul	6	221.0	0	1	0.0	0.6
3-Jul	6	237.0	0	1	0.0	0.6
4-Jul	6	217.0	1	2	0.8	1.4
5-Jul	6	230.5	1	3	0.8	2.2
6-Jul	6	230.5	0	3	0.0	2.2
7-Jul	6	221.5	0	3	0.0	2.2
8-Jul	6	209.5	1	4	0.8	3.0
9-Jul	6	250.0	0	4	0.0	3.0
10-Jul	6	220.0	0	4	0.0	3.0
11-Jul	6	252.5	0	4	0.0	3.0
12-Jul	6	248.5	1	5	0.7	3.7
13-Jul	6	233.0	0	5	0.0	3.7
14-Jul	6	217.0	0	5	0.0	3.7
15-Jul	6	218.5	0	5	0.0	3.7
16-Jul	6	248.0	0	5	0.0	3.7
17-Jul	6	236.5	0	5	0.0	3.7
18-Jul	6	241.0	1	6	0.7	4.3
19-Jul	6	241.5	0	6	0.0	4.3
20-Jul	6	217.0	0	6	0.0	4.3
21-Jul	6	235.5	0	6	0.0	4.3
22-Jul	6	219.0	0	6	0.0	4.3
23-Jul	6	241.5	0	6	0.0	4.3
24-Jul	6	223.0	0	6	0.0	4.3
25-Jul	1	46.5	0	6	0.0	4.3
26-Jul	6	206.5	0	6	0.0	4.3
27-Jul	6	268.5	0	6	0.0	4.3
28-Jul	6	221.0	0	6	0.0	4.3
29-Jul	6	220.5	0	6	0.0	4.3
30-Jul	6	223.0	0	6	0.0	4.3

Appendix D.2. Estimated chinook salmon catch by date and station, Upper Cook Inlet offshore test fish project 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0	1	0	0	0	0	1
2-Jul	0	0	0	0	0	0	0
3-Jul	0	0	0	0	0	0	0
4-Jul	0	0	1	0	0	0	1
5-Jul	0	1	0	0	0	0	1
6-Jul	0	0	0	0	0	0	0
7-Jul	0	0	0	0	0	0	0
8-Jul	0	1	0	0	0	0	1
9-Jul	0	0	0	0	0	0	0
10-Jul	0	0	0	0	0	0	0
11-Jul	0	0	0	0	0	0	0
12-Jul	0	0	0	0	1	0	1
13-Jul	0	0	0	0	0	0	0
14-Jul	0	0	0	0	0	0	0
15-Jul	0	0	0	0	0	0	0
16-Jul	0	0	0	0	0	0	0
17-Jul	0	0	0	0	0	0	0
18-Jul	0	0	1	0	0	0	1
19-Jul	0	0	0	0	0	0	0
20-Jul	0	0	0	0	0	0	0
21-Jul	0	0	0	0	0	0	0
22-Jul	0	0	0	0	0	0	0
23-Jul	0	0	0	0	0	0	0
24-Jul	0	0	0	0	0	0	0
25-Jul		0					0
26-Jul	0	0	0	0	0	0	0
27-Jul	0	0	0	0	0	0	0
28-Jul	0	0	0	0	0	0	0
29-Jul	0	0	0	0	0	0	0
30-Jul	0	0	0	0	0	0	0
Total	0.0	3.0	2.0	0.0	1.0	0.0	6.0
%	0%	50%	33%	0%	17%	0%	100%

Appendix D.3. Estimated chinook salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2002.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0.0	0.6	0.0	0.0	0.0	0.0	0.6
2-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jul	0.0	0.0	0.8	0.0	0.0	0.0	0.8
5-Jul	0.0	0.8	0.0	0.0	0.0	0.0	0.8
6-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Jul	0.0	0.8	0.0	0.0	0.0	0.0	0.8
9-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jul	0.0	0.0	0.0	0.0	0.7	0.0	0.7
13-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jul	0.0	0.0	0.7	0.0	0.0	0.0	0.7
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jul		0.0					0.0
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	2.2	1.5	0.0	0.7	0.0	4.3
%	0%	51%	34%	0%	15%	0%	100%

Appendix E.1. Entry pattern of sockeye salmon into Upper Cook Inlet, Alaska, 2002 estimated from daily CPUE measured at the latitude of Anchor Point.

Day	Date	Input y	Estimated y	Residual	Change in Input Y	Change in estimated Y
8	1-Jul	0.0410	0.0824	-0.0414		
9	2-Jul	0.0558	0.0995	-0.0437	0.0148	0.0171
10	3-Jul	0.0991	0.1196	-0.0205	0.0433	0.0201
11	4-Jul	0.1177	0.1432	-0.0254	0.0186	0.0236
12	5-Jul	0.1374	0.1705	-0.0331	0.0197	0.0273
13	6-Jul	0.1737	0.2017	-0.0280	0.0363	0.0313
14	7-Jul	0.2139	0.2371	-0.0232	0.0403	0.0354
15	8-Jul	0.2167	0.2765	-0.0598	0.0028	0.0394
16	9-Jul	0.3313	0.3197	0.0116	0.1146	0.0432
17	10-Jul	0.3745	0.3663	0.0083	0.0432	0.0466
18	11-Jul	0.4613	0.4155	0.0459	0.0868	0.0492
19	12-Jul	0.5063	0.4664	0.0399	0.0450	0.0509
20	13-Jul	0.6066	0.5180	0.0886	0.1003	0.0516
21	14-Jul	0.6106	0.5693	0.0413	0.0040	0.0513
22	15-Jul	0.6275	0.6191	0.0084	0.0169	0.0498
23	16-Jul	0.6847	0.6666	0.0181	0.0571	0.0474
24	17-Jul	0.7192	0.7108	0.0084	0.0345	0.0443
25	18-Jul	0.7376	0.7514	-0.0139	0.0184	0.0406
26	19-Jul	0.7734	0.7880	-0.0146	0.0358	0.0366
27	20-Jul	0.8004	0.8205	-0.0201	0.0270	0.0325
28	21-Jul	0.8306	0.8490	-0.0184	0.0302	0.0285
29	22-Jul	0.8355	0.8736	-0.0382	0.0048	0.0246
30	23-Jul	0.8702	0.8948	-0.0246	0.0347	0.0211
31	24-Jul	0.8765	0.9127	-0.0363	0.0063	0.0179
32	25-Jul	0.8871	0.9278	-0.0408	0.0106	0.0151
33	26-Jul	0.9043	0.9405	-0.0362	0.0173	0.0127
34	27-Jul	0.9269	0.9511	-0.0242	0.0225	0.0106
35	28-Jul	0.9382	0.9599	-0.0216	0.0114	0.0088
36	29-Jul	0.9432	0.9671	-0.0239	0.0050	0.0073
37	30-Jul	0.9514	0.9731	-0.0217	0.0081	0.0060

Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2002 offshore test fish project (page 1 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
1-Jul	4	11	8.4	35	southeast	flood	31.6	24	8.0
	5	11	9.5	38	southeast	flood	30.4	35	6.0
	6	11	9.3	35	south	low	30.4	45	3.0
	6.5	12	9.3	37	south	low	30.3	44	3.0
	7	12	9.3	25	south	ebb	30.4	45	3.0
	8	11	9.4	25	south	ebb	30.2	28	2.5
2-Jul	8	11	9.1	20	south	low	30.4	30	2.0
	7	12	9.3	25	south	low	30.3	45	3.5
	6.5	12	9.4	28	south	ebb	30.2	44	3.5
	6	12	9.5	25	southeast	ebb	30.3	48	4.0
	5	13	9.3	25	southeast	ebb	30.5	37	6.0
	4	12	9.0	22	southeast	ebb	31.0	24	6.0
3-Jul	4	12	9.5	22	southeast	ebb	30.6	26	5.0
	5	12	9.7	25	southeast	ebb	30.4	37	5.0
	6	11	9.7	32	southeast	ebb	30.4	28	4.0
	6.5	11	9.5	34	southeast	flood	30.5	41	4.0
	7	11	9.5	36	southeast	flood	30.5	44	3.0
	8	11	9.8	35	southeast	flood	30.3	30	3.0
4-Jul	8	11	9.5	10	southwest	flood	30.2	29	3.0
	7	12	9.8	4	southwest	flood	29.8	44	3.0
	6.5	12	9.8	5	southwest	flood	30.0	40	3.5
	6	13	9.7	5	southwest	low	30.1	46	4.0
	5	14	10.0	6	southeast	ebb	30.0	32	5.0
	4	14	9.3	8	southwest	ebb	31.3	24	7.0
5-Jul	4	12	9.7	21	south	ebb	30.5	26	6.0
	5	13	9.7	20	south	ebb	30.1	37	5.0
	6	11	10.7	25	south	ebb	29.7	47	4.0
	6.5	12	10.7	30	southeast	ebb	29.7	47	3.5
	7	12	10.2	32	southeast	high	30.0	45	2.5
	8	12	10.4	35	southeast	flood	29.6	24	2.5
6-Jul	8	11	9.7	30	southwest	flood	30.0	30	2.5
	7	11	9.7	24	southwest	flood	30.2	44	2.0
	6.5	11	9.9	28	south	flood	29.8	44	3.0
	6	11	9.9	25	southwest	low	29.8	45	4.0
	5	12	10.2	20	southwest	ebb	30.1	36	4.0
	4	12	9.2	20	southwest	ebb	31.4	25	7.0

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2002 offshore test fish project (page 2 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
7-Jul	4	10	10.1	10	west	flood	30.0	23	3.0
	5	11	10.4	8	west	low	29.4	35	3.0
	6	11	10.6	10	southwest	ebb	28.9	47	3.0
	6.5	11	10.6	10	southeast	ebb	29.4	43	3.5
	7	12	10.6	2	southwest	ebb	29.2	44	3.0
	8	12	10.1	2	southwest	ebb	29.8	32	3.0
8-Jul	8	12	9.9	8	southwest	flood	30.2	28	3.5
	7	12	9.9	12	southwest	flood	30.1	43	4.0
	6.5	12	9.6	10	southwest	flood	30.4	43	4.0
	6	12	9.8	8	southwest	flood	30.3	46	4.0
	5	14	10.8	10	southwest	low	28.8	38	4.0
	4	14	9.6	10	southwest	ebb	31.2	24	8.0
9-Jul	4	12	9.5	4	south	low	31.2	23	6.0
	5	13	9.4	3	north	ebb	31.1	35	7.0
	6	13	9.7	4	north	ebb	31.3	46	4.0
	6.5	13	10.0	5	north	ebb	30.1	43	3.5
	7	13	10.6	10	southwest	ebb	29.4	43	4.0
	8	13	9.7	3	southwest	high	30.5	30	3.0
10-Jul	8	12	9.9	0	none	flood	30.1	29	4.0
	7	12	10.0	0	none	flood	30.0	43	4.0
	6.5	12	9.8	0	none	flood	30.2	43	3.5
	6	12	9.4	2	north	flood	30.9	45	5.5
	5	13	9.3	8	north	ebb	31.4	38	8.0
	4	13	9.6	7	north	ebb	31.6	24	9.0
11-Jul	4	15	9.9	20	southeast	flood	31.5	21	8.0
	5	14	9.7	18	southeast	flood	31.1	37	5.0
	6	14	9.7	15	southeast	low	30.6	45	3.0
	6.5	14	10.3	15	southeast	ebb	30.3	41	2.5
	7	14	10.0	18	southeast	ebb	30.4	45	2.5
	8	14	9.8	20	southeast	ebb	30.4	31	2.5
12-Jul	8	12	9.5	25	southeast	ebb	30.7	31	2.0
	7	12	9.6	25	southeast	high	30.5	46	3.0
	6.5	12	9.8	22	southeast	flood	30.4	41	3.5
	6	12	10.0	15	southeast	flood	30.3	46	4.0
	5	12	9.8	18	southwest	low	31.2	35	4.0
	4	12	9.8	15	southwest	ebb	31.6	22	7.0

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2002 offshore test fish project (page 3 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
13-Jul	4	12	9.5	0	none	flood	31.6	23	7.0
	5	12	9.1	8	southwest	flood	31.1	38	7.0
	6	12	10.0	4	southwest	flood	30.1	46	3.0
	6.5	12	10.4	10	west	flood	29.8	40	2.0
	7	12	10.1	4	west	ebb	30.2	45	2.0
	8	12	10.4	5	west	ebb	30.0	30	1.5
14-Jul	8	11	10.0	0	none	ebb	30.4	29	3.0
	7	11	9.7	0	none	low	30.7	45	3.5
	6.5	12	9.5	0	none	low	31.0	43	5.0
	6	12	9.2	0	none	flood	31.5	48	7.0
	5	12	9.0	0	none	flood	31.9	35	8.0
	4	12	9.2	0	none	flood	31.7	22	9.0
15-Jul	4	12	9.0	5	northwest	flood	31.8	24	12.0
	5	13	9.3	5	northwest	flood	31.4	34	7.0
	6	13	10.3	0	none	flood	31.3	46	4.0
	6.5	13	10.7	0	none	flood	29.9	41	3.0
	7	13	10.9	5	southwest	low	29.4	43	2.0
	8	13	10.7	8	southwest	ebb	29.8	25	1.5
16-Jul	8	11	10.5	15	southeast	ebb	29.8	31	2.0
	7	11	10.3	15	southeast	ebb	29.9	45	3.0
	6.5	12	9.9	12	southeast	ebb	30.7	42	4.5
	6	12	9.8	10	southeast	high	31.0	45	4.0
	5	12	9.2	5	southeast	flood	31.5	35	8.0
	4	12	9.2	5	southeast	flood	31.8	22	9.0
17-Jul	4	15	9.0	10	southeast	ebb	31.8	25	11.0
	5	14	9.2	5	south	low	31.6	38	10.0
	6	14	9.6	5	south	low	31.2	47	7.0
	6.5	15	10.9	8	south	flood	29.8	42	3.5
	7	17	10.7	2	south	flood	29.9	43	2.0
	8	17	11.2	2	south	flood	29.8	31	2.0
18-Jul	8	11	10.5	20	southwest	low	30.0	28	1.5
	7	11	11.0	25	southwest	ebb	28.7	44	2.0
	6.5	12	10.5	20	southwest	ebb	30.6	44	3.0
	6	12	10.3	22	southwest	ebb	30.7	45	3.5
	5	12	9.2	8	southwest	ebb	31.7	37	8.0
	4	12	9.2	20	southwest	ebb	31.7	25	9.0

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2002 offshore test fish project (page 4 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
19-Jul	4	12	9.3	5	northwest	ebb	31.7	25	9.0
	5	13	9.5	15	northwest	ebb	31.4	36	9.0
	6	12	10.1	12	northwest	ebb	30.8	48	4.5
	6.5	13	11.4	0	none	flood	29.5	42	2.0
	7	14	10.7	5	southeast	flood	29.9	44	2.0
	8	14	10.6	0	none	flood	30.0	29	2.0
20-Jul	8	11	10.8	0	none	flood	30.0	28	2.0
	7	11	11.1	4	east	flood	29.4	43	2.5
	6.5	12	11.3	12	northwest	flood	28.9	42	2.5
	6	12	10.2	15	northwest	low	30.7	45	3.5
	5	12	9.5	12	northeast	ebb	31.5	38	7.0
	4	13	10.6	5	northwest	ebb	31.6	23	11.0
21-Jul	4	12	9.6	15	northwest	low	31.6	23	8.5
	5	13	9.5	20	northwest	ebb	31.4	37	5.0
	6	13	10.0	22	northwest	ebb	31.9	46	4.0
	6.5	13	10.2	25	northwest	ebb	30.6	42	4.0
	7	13	10.6	25	northwest	ebb	30.0	45	2.5
	8	13	10.8	15	northwest	high	29.7	31	2.5
22-Jul	8	12	11.0	5	northwest	flood	29.4	29	2.0
	7	11	11.0	5	north	flood	29.6	42	2.5
	6.5	12	10.9	5	northwest	flood	29.5	43	3.0
	6	12	11.0	8	north	flood	29.7	44	3.0
	5	11	9.7	15	north	low	31.4	35	7.0
	4	12	9.7	20	north	ebb	31.5	25	9.0
23-Jul	4	12	9.8	20	northwest	flood	31.6	22	5.0
	5	13	9.7	25	northwest	low	31.3	35	4.5
	6	14	9.9	25	northwest	ebb	30.8	44	4.0
	6.5	14	10.1	25	northwest	ebb	30.6	42	3.0
	7	13	10.5	15	northeast	ebb	30.2	45	4.0
	8	13	10.7	20	northwest	ebb	29.7	31	2.0
24-Jul	8	12	10.8	0	none	high	29.8	33	3.0
	7	11	10.6	12	southwest	flood	30.0	45	3.0
	6.5	12	10.5	10	southwest	flood	29.5	44	3.0
	6	13	10.9	12	southwest	flood	29.5	44	4.0
	5	14	9.6	10	southwest	low	31.3	35	6.0
	4	12	9.6	10	southeast	ebb	31.5	23	6.0

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2002 offshore test fish project (page 5 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
25-Jul	5	12	10.6	32	southeast	flood	29.9	35	2.5
26-Jul	8	11	10.9	5	north	ebb	29.8	28	2.0
	7	10	10.5	10	northeast	flood	30.1	44	2.5
	6.5	10	10.3	10	southeast	flood	30.3	43	3.5
	6	10	10.8	15	northeast	flood	29.7	45	3.5
	5	10	9.3	17	southeast	flood	31.5	36	8.0
	4	10	9.2	20	southeast	flood	31.7	23	9.0
27-Jul	4	16	9.2	15	southeast	flood	31.7	23	9.0
	5	15	10.9	16	southeast	flood	30.0	33	4.0
	6	17	11.5	12	southeast	low	29.1	44	2.5
	6.5	14	11.7	15	southeast	ebb	29.2	43	2.0
	7	14	12.3	15	southeast	ebb	29.4	43	2.5
	8	12	11.3	15	southwest	ebb	29.6	30	3.0
28-Jul	8	11	10.9	0	none	ebb	29.5	29	2.0
	7	11	10.8	0	none	high	29.8	43	3.0
	6.5	11	10.2	10	northwest	flood	30.7	45	4.5
	6	12	10.1	10	northwest	flood	30.9	45	5.0
	5	12	9.7	5	northwest	flood	31.3	33	8.0
	4	13	9.5	0	none	flood	31.5	23	9.0
29-Jul	4	15	9.6	10	southeast	flood	31.7	24	10.0
	5	12	9.6	10	southeast	flood	31.4	35	7.0
	6	17	11.2	11	southeast	flood	29.6	44	3.0
	6.5	17	11.6	5	south	flood	29.5	42	3.0
	7	18	11.4	0	none	flood	28.6	42	3.0
	8	14	11.0	8	south	low	29.8	29	1.5
30-Jul	8	12	11.2	10	southeast	ebb	29.5	29	2.0
	7	13	11.3	5	southeast	ebb	29.3	43	3.0
	6.5	18	11.4	5	south	ebb	29.4	42	3.5
	6	18	9.9	5	west	ebb	31.4	48	8.5
	5	19	9.7	10	southwest	high	31.5	36	10.0
	4	13	9.7	12	northwest	flood	31.5	24	13.0

Appendix G.1. Yearly mean values of physical observations made during the conduct of the 1992-2002 offshore test fish project.

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
4	1992	11.5	10.4	4.5	northeast	29.4	25.9	7.6
	1993	13.2	9.7	4.8	northeast	26.8	24.7	7.9
	1994	12.5	9.3	9.0	southeast	29.8	25.5	9.4
	1995	13.1	9.1	5.6	east	27.1	25.0	7.9
	1996	12.8	9.4	7.4	east	31.5	24.6	7.9
	1997	13.7	9.5	8.9	southeast	31.6	24.6	6.2
	1998	12.5	9.7	9.7	southeast	31.0	24.4	9.5
	1999	13.1	9.6	10.6	southeast	31.4	24.3	7.6
	2000	13.8	9.7	10.0	southeast	31.5	23.5	10.0
	2001	12.9	9.8	11.1	southeast	31.5	23.6	8.4
	2002	12.6	9.5	12.6	south	31.4	23.6	8.1
Station 4 Averages =		**12.9**	**9.6**	**8.6**	**southeast**	**30.3**	**24.5**	**8.2**
5	1992	11.6	10.7	6.3	east	29.0	38.9	5.3
	1993	13.6	9.9	6.7	southeast	26.8	37.2	6.2
	1994	13.3	9.5	8.1	southeast	29.9	37.2	7.9
	1995	13.2	9.2	6.9	east	26.8	37.9	6.0
	1996	12.8	9.4	8.6	northeast	31.3	36.3	6.3
	1997	13.7	9.9	10.1	southeast	31.3	36.8	5.2
	1998	12.8	9.8	9.8	southeast	31.1	35.2	8.5
	1999	13.4	10.0	12.9	southeast	30.6	38.9	6.2
	2000	13.5	10.1	11.8	southeast	30.7	35.9	7.1
	2001	12.9	10.1	11.2	southeast	31.0	35.5	6.9
	2002	12.8	9.7	13.9	south	30.9	35.8	6.3
Station 5 Averages =		**13.0**	**9.8**	**9.7**	**southeast**	**29.9**	**36.8**	**6.5**
6	1992	12.0	11.1	5.9	east	28.4	46.7	3.9
	1993	13.8	10.6	6.7	southeast	26.2	46.4	4.8
	1994	12.9	10.0	9.4	southeast	28.8	47.0	5.1
	1995	13.1	9.5	7.8	east	26.5	47.2	3.9
	1996	12.4	10.2	9.7	east	30.6	47.1	4.2
	1997	13.8	10.5	11.1	southeast	30.8	45.9	3.7
	1998	12.4	10.3	10.9	south	30.0	46.1	4.7
	1999	13.5	10.3	12.5	southeast	29.8	44.4	4.3
	2000	13.5	10.6	11.1	southeast	29.9	45.4	4.9
	2001	12.8	10.7	10.7	south	30.5	46.2	5.2
	2002	12.7	10.1	13.4	south	30.4	45.1	4.2
Station 6 Averages =		**13.0**	**10.4**	**9.9**	**southeast**	**29.3**	**46.2**	**4.4**

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
6.5	1992	13.3	11.6	4.3	east	28.0	44.4	3.0
	1993	15.4	11.2	6.8	southeast	25.9	44.1	3.4
	1994	13.5	10.5	9.3	south	28.6	43.1	3.4
	1995	13.8	10.2	8.5	southeast	27.5	43.3	3.3
	1996	13.2	10.3	8.4	east	30.5	42.9	3.2
	1997	13.9	10.7	9.4	east	29.6	43.4	3.2
	1998	12.7	10.5	7.7	southeast	29.5	43.3	3.5
	1999	13.4	10.5	13.0	southeast	29.7	43.2	3.5
	2000	13.6	10.8	13.0	south	29.7	42.9	3.7
	2001	12.8	11.1	11.8	south	29.4	42.7	4.0
	2002	12.6	10.4	13.7	south	30.0	42.6	3.3
Station 6.5 Averages =		**13.5**	**10.7**	**9.6**	**southeast**	**30.0**	**43.3**	**3.4**
7	1992	12.2	11.4	5.7	east	27.7	44.5	2.7
	1993	13.5	10.8	8.1	south	25.6	45.1	3.4
	1994	13.3	10.4	10.5	south	28.4	45.2	3.3
	1995	12.7	9.8	10.1	southeast	26.1	44.8	3.1
	1996	12.7	10.4	10.7	southeast	30.3	44.9	3.4
	1997	14.0	10.9	10.3	southeast	30.2	44.8	2.9
	1998	12.3	10.7	8.4	southeast	29.1	44.3	3.0
	1999	13.3	10.6	13.0	south	29.5	42.7	2.9
	2000	13.1	10.9	13.6	south	29.4	43.3	3.0
	2001	13.1	11.4	9.9	southeast	29.0	43.6	3.5
	2002	12.4	10.4	12.4	southeast	29.9	44.0	2.8
Station 7 Averages =		**13.0**	**10.7**	**10.2**	**southeast**	**29.9**	**44.3**	**3.1**
8	1992	12.2	11.4	5.1	east	27.8	29.7	2.5
	1993	12.7	11.1	8.2	southeast	25.4	27.7	3.4
	1994	12.7	10.6	9.2	southeast	28.1	28.9	4.2
	1995	12.9	9.9	9.2	east	25.9	28.4	2.7
	1996	12.2	10.4	9.3	southeast	30.3	29.9	2.7
	1997	13.7	11.1	9.6	southeast	30.1	30.1	2.6
	1998	12.5	10.7	9.1	south	29.1	29.3	2.8
	1999	13.6	10.5	11.8	southeast	30.0	25.9	2.6
	2000	13.2	11.0	14.0	south	29.5	29.1	2.6
	2001	12.8	11.3	9.5	southeast	29.0	28.9	3.1
	2002	12.1	10.3	11.8	southeast	30.0	29.4	2.4
Station 8 Averages =		**12.8**	**10.8**	**9.7**	**southeast**	**30.0**	**28.8**	**2.9**

Appendix H.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, Made during the 2002 season (page 1 of 6).

Total Run Estimate Based on Offshore Test Fishing Information

Assume 15 July is mean 50% point of run across transect (On Time)
Fit of 2001 data to 1979-2001 data

		Estimated Total CPUE			
Year	MSS	Current	Previous Day	Difference	Timing
1979	0.00641	1,591	1,578	12	Early 5 days
1980	0.02975	1,353	1,322	31	Early 9 days
1981	0.02692	1,315	1,285	30	Early 9 days
1982	0.00127	2,735	2,773	-39	Late 2 days
1983	0.00106	2,496	2,554	-58	On Time
1984	0.00381	1,725	1,722	4	Early 4 days
1985	0.00194	2,397	2,417	-19	On Time
1986	0.00127	2,512	2,548	-36	Late 1 day
1987	0.00084	3,331	3,432	-101	Late 2 days
1988	0.00283	2,028	2,034	-6	Early 2 days
1989	0.00634	2,144	2,131	13	On Time
1990	0.00230	3,903	4,163	-260	Late 3 days
1991	0.00114	2,980	3,081	-100	Late 2 days
1992	0.00233	3,205	3,376	-171	Late 2 days
1993	0.00111	2,199	2,235	-35	Early 1 day
1994	0.00079	3,371	3,452	-82	Late 4 days
1995	0.00143	2,390	2,459	-69	On Time
1996	0.00116	2,022	2,062	-40	Early 2 days
1997	0.00115	2,636	2,679	-43	Late 1 day
1998	0.00122	2,885	2,926	-41	Late 3 days
1999	0.00208	3,206	3,369	-162	Late 3 days
2000	0.00142	1,840	1,875	-35	Early 2 days
2001	0.00143	1,881	1,895	-14	Early 2 days

TOTAL RUN THROUGH		**18-Jul**	**3,432,400**	
Escapement			**919,807**	
	Above Sonar			649,832
	Below Sonar			150,000
	Unassessed (15% of total assessed)			119,975
Cumulative Catch			**2,018,052**	
	Daily Drift			257,095
	Daily Set			254,096
Residual in District			**494,541**	
	Drift (40% expploitation, if full district; 25%, if reduced district)			385,643
	Set (70% exploitation)			108,898
2002 cumulative cpue	1,145	through	15-Jul	
2002 cumulative cpue	1,346	through	18-Jul	

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Appendix H.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, Made during the 2002 season (page 2 of 6).

Offshore Test Fishing Total Run Estimates for 2002

Passage Rate (Total Run/Cumulative CPUE) **2,550** Based on **18-Jul** harvest
Total cpue for season, if 15 July is 50% point: **2,290**

Run Estimate Based on Average Timing (15 July 50% Point) **5,839,669**
Run Remaining **2,407,270**

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

		Estimated Total CPUE			Estimated		Run	
Year	MSS	Current	Previous Day	Difference	Total Run	Timing	Remaining	Mean/Day
1994	0.00079	3,371	3,452	-82	8,595,840	Late 4 days	5,657,982	145
1987	0.00084	3,331	3,432	-101	8,495,189	Late 2 days	5,557,330	142
1983	0.00106	2,496	2,554	-58	6,365,469	On Time	3,427,610	82
1993	0.00111	2,199	2,235	-35	5,608,658	Early 1 day	2,670,799	61
1991	0.00114	2,980	3,081	-100	7,600,445	Late 2 days	4,662,586	117
1997	0.00115	2,636	2,679	-43	6,722,072	Late 1 day	3,784,213	92
1996	0.00116	2,022	2,062	-40	5,155,255	Early 2 days	2,217,396	48
1998	0.00122	2,885	2,926	-41	7,357,040	Late 3 days	4,419,181	110
1986	0.00127	2,512	2,548	-36	6,404,689	Late 1 day	3,466,831	83
1982	0.00127	2,735	2,773	-39	6,973,279	Late 2 days	4,035,421	99
2000	0.00142	1,840	1,875	-35	4,692,978	Early 2 days	1,755,119	35
2001	0.00143	1,881	1,895	-14	4,796,868	Early 2 days	1,859,009	38
1995	0.00143	2,390	2,459	-69	6,093,886	On Time	3,156,028	75
1985	0.00194	2,397	2,417	-19	6,113,318	On Time	3,175,459	75
1999	0.00208	3,206	3,369	-162	8,176,481	Late 3 days	5,238,622	133
1990	0.00230	3,903	4,163	-260	9,953,296	Late 3 days	7,015,437	183
1992	0.00233	3,205	3,376	-171	8,172,885	Late 2 days	5,235,026	133
1988	0.00283	2,028	2,034	-6	5,170,913	Early 2 days	2,233,054	49
1984	0.00381	1,725	1,722	4	4,399,719	Early 4 days	1,461,860	27
1989	0.00634	2,144	2,131	13	5,467,461	On Time	2,529,602	57
1979	0.00641	1,591	1,578	12	4,056,607	Early 5 days	1,118,748	17
1981	0.02692	1,315	1,285	30	3,354,291	Early 9 days	416,432	-2
1980	0.02975	1,353	1,322	31	3,450,352	Early 9 days	512,493	1

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Appendix H.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2002 season (page 3 of 6).

Total Run Estimate Based on Offshore Test Fishing Information

Assume 15 July is mean 50% point of run across transect (On Time)
Fit of 2001 data to 1979-2001 data

		Estimated Total CPUE			
Year	MSS	Current	Previous Day	Difference	Timing
1979	0.00563	1,635	1,628	7	Early 5 days
1980	0.02810	1,460	1,439	21	Early 9 days
1981	0.02614	1,421	1,400	21	Early 9 days
1982	0.00183	2,569	2,614	-46	Late 2 days
1983	0.00243	2,300	2,347	-47	On Time
1984	0.00315	1,739	1,739	0	Early 4 days
1985	0.00199	2,306	2,333	-28	On Time
1986	0.00185	2,368	2,406	-38	Late 1 day
1987	0.00264	2,960	3,050	-90	Late 2 days
1988	0.00242	1,996	2,008	-12	Early 2 days
1989	0.00522	2,159	2,164	-5	On Time
1990	0.00749	3,117	3,281	-164	Late 3 days
1991	0.00343	2,642	2,720	-78	Late 2 days
1992	0.00665	2,690	2,799	-109	Late 2 days
1993	0.00177	2,083	2,112	-29	Early 1 day
1994	0.00205	3,046	3,129	-83	Late 4 days
1995	0.00331	2,180	2,226	-46	On Time
1996	0.00198	1,913	1,937	-24	Early 2 days
1997	0.00190	2,465	2,510	-45	Late 1 day
1998	0.00179	2,702	2,753	-51	Late 3 days
1999	0.00609	2,708	2,815	-107	Late 3 days
2000	0.00188	1,763	1,779	-15	Early 2 days
2001	0.00179	1,922	1,945	-11	Early 2 days

TOTAL RUN THROUGH		**22-Jul**	**4,015,954**	
Escapement			**1,130,673**	
	Above Sonar			933,194
	Below Sonar			50,000
	Unassessed (15% of total assessed)			147,479
Cumulative Catch			**2,584,000**	
	Daily Drift			175,939
	Daily Set			87,202
Residual in District			**301,281**	
	Drift (40% expploitation, if full district; 25%, if reduced district)			263,909
	Set (70% exploitation)			37,372

2002 cumulative cpue	1,145	through	15-Jul
2002 cumulative cpue	1,525	through	22-Jul

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Appendix H.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2002 season (page 4 of 6).

Offshore Test Fishing Total Run Estimates for 2002

Passage Rate (Total Run/Cumulative CPUE) **2,646** Based on **22-Jul** harvest
Total cpue for season, if 15 July is 50% point: **2,290**

Run Estimate Based on Average Timing (15 July 50% Point) **6,059,160**
Run Remaining **2,024,130**

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

		Estimated Total CPUE			Estimated		Run	
Year	MSS	Current	Previous Day	Difference	Total Run	Timing	Remaining	Mean/Day
1993	0.00177	2,083	2,112	-29	5,511,931	Early 1 day	1,797,258	40
1998	0.00179	2,702	2,753	-51	7,149,174	Late 3 days	3,434,501	84
2001	0.00179	1,922	1,945	-23	5,085,461	Early 2 days	1,370,788	28
1982	0.00183	2,569	2,614	-46	6,797,028	Late 2 days	3,082,355	75
1986	0.00185	2,368	2,406	-38	6,264,775	Late 1 day	2,550,102	60
2000	0.00188	1,763	1,779	-15	4,665,977	Early 2 days	951,304	17
1997	0.00190	2,465	2,510	-45	6,522,540	Late 1 day	2,807,867	67
1996	0.00198	1,913	1,937	-24	5,060,907	Early 2 days	1,346,234	28
1985	0.00199	2,306	2,333	-28	6,100,913	On Time	2,386,240	56
1994	0.00205	3,046	3,129	-83	8,058,656	Late 4 days	4,343,983	109
1988	0.00242	1,996	2,008	-12	5,281,444	Early 2 days	1,566,771	34
1983	0.00243	2,300	2,347	-47	6,085,990	On Time	2,371,317	55
1987	0.00264	2,960	3,050	-90	7,831,663	Late 2 days	4,116,990	102
1984	0.00315	1,739	1,739	0	4,602,474	Early 4 days	887,801	15
1995	0.00331	2,180	2,226	-46	5,767,923	On Time	2,053,250	47
1991	0.00343	2,642	2,720	-78	6,989,201	Late 2 days	3,274,528	80
1989	0.00522	2,159	2,164	-5	5,712,333	On Time	1,997,660	45
1979	0.00563	1,635	1,628	7	4,327,272	Early 5 days	612,599	8
1999	0.00609	2,708	2,815	-107	7,165,155	Late 3 days	3,450,482	85
1992	0.00665	2,690	2,799	-109	7,117,370	Late 2 days	3,402,697	83
1990	0.00749	3,117	3,281	-164	8,248,131	Late 3 days	4,533,458	114
1981	0.02614	1,421	1,400	21	3,761,098	Early 9 days	46,425	-7
1980	0.02810	1,460	1,439	21	3,863,918	Early 9 days	149,245	-5

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Appendix H.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2002 season (page 5 of 6).

Total Run Estimate Based on Offshore Test Fishing Information

Assume 15 July is mean 50% point of run across transect (On Time)
Fit of 2001 data to 1979-2000 data

		Estimated Total CPUE			
Year	MSS	Current	Previous Day	Difference	Timing
1979	0.00518	1,653	1,659	-6	Early 5 days
1980	0.02678	1,502	1,518	-16	Early 9 days
1981	0.02543	1,464	1,481	-17	Early 9 days
1982	0.00277	2,488	2,448	40	Late 2 days
1983	0.00364	2,224	2,189	35	On Time
1984	0.00279	1,745	1,745	-1	Early 4 days
1985	0.00240	2,257	2,232	25	On Time
1986	0.00267	2,269	2,302	-32	Late 1 day
1987	0.00483	2,802	2,730	72	Late 2 days
1988	0.00231	1,978	1,967	11	Early 2 days
1989	0.00467	2,149	2,140	9	On Time
1990	0.01236	2,854	2,746	108	Late 3 days
1991	0.00566	2,510	2,452	58	Late 2 days
1992	0.01011	2,517	2,445	72	Late 2 days
1993	0.00231	2,039	2,018	21	Early 1 day
1994	0.00382	2,897	2,826	71	Late 4 days
1995	0.00450	2,108	2,077	31	On Time
1996	0.00227	1,880	1,866	14	Early 2 days
1997	0.00292	2,387	2,349	38	Late 1 day
1998	0.00281	2,610	2,565	46	Late 3 days
1999	0.00943	2,537	2,465	72	Late 3 days
2000	0.00181	1,747	1,741	6	Early 2 days
2001	0.00131	1,828	1,821	7	Early 2 days

TOTAL RUN THROUGH		**25-Jul**	**4,075,816**	
Escapement			**1,247,992**	
	Above Sonar			1,035,210
	Below Sonar			50,000
	Unassessed (15% of total assessed)			162,782
Cumulative Catch			**2,739,804**	
	Daily Drift			30,636
	Daily Set			98,156
Residual in District			**88,021**	
	Drift (40% expploitation, if full district; 25%, if reduced district)			45,954
	Set (70% exploitation)			42,067

2000 cumulative cpue	1,145	through	15-Jul
2000 cumulative cpue	1,619	through	25-Jul

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Appendix H.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2002 season (page 6 of 6).

Offshore Test Fishing Total Run Estimates for 2001

Passage Rate (Total Run/Cumulative CPUE) **2,517** Based on **25-Jul** harvest
Total cpue for season, if 15 July is 50% point: **2,290**

Run Estimate Based on Average Timing (15 July 50% Point) **5,765,052**
Run Remaining **1,689,236**

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

		Estimated Total CPUE			Estimated		Run	
Year	MSS	Current	Previous Day	Difference	Total Run	Timing	Remaining	Mean/Day
2001	0.00131	1,828	1,821	7	4,601,242	Early 2 days	613,446	15
2000	0.00181	1,747	1,741	6	4,399,188	Early 2 days	411,392	9
1996	0.00227	1,880	1,866	14	4,732,730	Early 2 days	744,935	19
1993	0.00231	2,039	2,018	21	5,131,954	Early 1 day	1,144,158	30
1988	0.00231	1,978	1,967	11	4,978,790	Early 2 days	990,994	26
1985	0.00240	2,257	2,232	25	5,683,133	On Time	1,695,338	46
1986	0.00267	2,269	2,302	-32	5,713,293	Late 1 day	1,725,497	46
1982	0.00277	2,488	2,448	40	6,263,062	Late 2 days	2,275,267	62
1984	0.00279	1,745	1,745	-1	4,391,837	Early 4 days	404,041	9
1998	0.00281	2,610	2,565	46	6,571,178	Late 3 days	2,583,382	71
1997	0.00292	2,387	2,349	38	6,009,576	Late 1 day	2,021,780	55
1983	0.00364	2,224	2,189	35	5,598,722	On Time	1,610,926	43
1994	0.00382	2,897	2,826	71	7,293,093	Late 4 days	3,305,298	91
1995	0.00450	2,108	2,077	31	5,306,819	On Time	1,319,023	35
1989	0.00467	2,149	2,140	9	5,410,967	On Time	1,423,172	38
1987	0.00483	2,802	2,730	72	7,055,165	Late 2 days	3,067,370	85
1979	0.00518	1,653	1,659	-6	4,161,436	Early 5 days	173,641	2
1991	0.00566	2,510	2,452	58	6,319,957	Late 2 days	2,332,162	64
1999	0.00943	2,537	2,465	72	6,386,218	Late 3 days	2,398,422	66
1992	0.01011	2,517	2,445	72	6,335,943	Late 2 days	2,348,148	64
1990	0.01236	2,854	2,746	108	7,185,168	Late 3 days	3,197,373	88
1981	0.02543	1,464	1,481	-17	3,685,177	Early 9 days	-302,618	-11
1980	0.02678	1,502	1,518	-16	3,780,414	Early 9 days	-207,381	-8

Appendix I.1. Yearly mean values for selected chemical and physical variables collected during conduct of the 2002 offshore test fish project.

Year	Air Temp. (c)	Water Temp. (c)	Wind Vel. (knots)	Salinity (ppt)	Secchi (m)
1979	12.4	12.2	5.9	25.0	5.7
1980	12.4	10.0	8.2	24.8	4.2
1981	13.4	11.0	10.1	23.1	4.1
1982	12.0	8.5	9.0	20.3	5.0
1983	14.9	10.9	9.4	20.6	4.7
1984	13.5	10.8	9.1	14.3	5.3
1985	10.8	8.2	9.2	28.0	5.5
1986	10.6	9.1	8.2	-	5.4
1987	12.6	10.1	4.1	28.4	5.1
1988	14.2	9.1	8.9	30.2	4.7
1989	13.1	10.0	4.4	27.7	4.7
1990	12.3	11.4	8.5	21.3	4.6
1991	10.9	9.9	6.6	13.1	4.1
1992	12.0	11.1	5.4	28.4	4.3
1993	13.5	10.5	6.9	26.2	5.0
1994	13.0	10.0	9.3	29.0	6.0
1995	13.1	9.5	7.9	26.5	4.6
1996	12.6	10.0	9.1	30.8	4.7
1997	13.8	10.5	10.0	30.6	4.0
1998	12.5	10.3	8.3	30.0	5.4
1999	13.4	10.3	12.4	30.2	4.5
2000	13.5	10.5	12.2	30.1	5.2
2001	12.9	10.7	10.7	30.1	5.2
1992-2001 Avg	13.0	10.3	9.2	29.2	4.9
2002	12.5	10.1	13.0	30.4	4.5